





1

2,743,555

**CENTERLESS GRINDING ATTACHMENT FOR LATHES**

Keith Irvine, Valley Stream, N. Y.

Application May 4, 1954, Serial No. 427,541

2 Claims. (Cl. 51—103)

This invention has reference to a device attachable to a metal cutting lathe of conventional construction, whereby to adapt the lathe for the centerless grinding of cylindrical objects.

Heretofore, centerless grinding has been carried out on machines designed specifically for this type of grinding operation. These machines have been developed to the point of producing extremely precise work in quantity, and the present invention is not intended to improve upon this particular type of apparatus. Rather, the present invention has as an important object the provision of a centerless grinding attachment for a conventional metal cutting lathe. The purpose of such an attachment would be to equip the lathe for centerless grinding, thereby making it unnecessary to purchase a centerless grinding machine when, as is often the case, the requirement for centerless grinding of cylindrical objects arises on only infrequent occasions, with said objects being produced in comparatively small quantities. In other words, in shops that are comparatively small, a metal cutting lathe is almost always a piece of the equipment. It is accordingly proposed to permit said lathe to be used as a centerless grinder on the comparatively few occasions in which grinding of this type is necessary.

In the carrying out of the invention, the grinding wheel is mounted on an arbor inserted in the spindle of the lathe, to effect high speed rotation of the grinding wheel. The regulating wheel ordinarily used on centerless grinding machines is mounted upon the compound slide structure of the lathe, while the centerless work rest is secured to the cross slide structure. By reason of this arrangement, the work piece and regulating wheel are properly positioned relative to the rapidly rotating grinding wheel, and further, due to a novel mounting for the regulating wheel, said regulating wheel can be adjusted to a plane slightly oblique to the plane of the grinding wheel, for feeding of the work in a proper direction and for holding of the work in proper position to the grinding wheel.

For further comprehension of the invention, and of the objects and advantages thereof, reference will be had to the following description and accompanying drawings, and to the appended claims in which the various novel features of the invention are more particularly set forth.

In the accompanying drawings forming a material part of this disclosure:

Fig. 1 is a side elevational view of a centerless grinding attachment for lathes, formed in accordance with the present invention.

Fig. 2 is a top plan view.

Fig. 3 is an enlarged sectional view on line 3—3 of Fig. 1.

Fig. 4 is an exploded perspective view of the regulating wheel mount.

The reference numeral 10 has been applied generally to a metal cutting lathe having a trackway 12 on which is mounted a cross slide 14 including a base 15 on which is slidably mounted a platform 16, the base having a dovetail tongue 18 engaged in a complementary groove

2

formed in the underside of platform 16. By a suitable mechanism well known in the art, rotation of a crank 20 slidably advances or retracts the platform 16 relative to the lathe spindle.

At its inner end, the platform 16 is enlarged transversely, and supported upon the enlarged part is a work rest 24 including a base 26 having slotted ears at its ends through which extend bolts 28, said bolts passing through the platform to clamp the base 26 to the platform. The base 26 is provided with a plurality of pivot bolts 26', on which are swingably mounted work guides 30. The guides 30 are arranged at opposite sides of an elongated, up-standing blade 32 having a beveled top edge, the blade 32 supporting the cylindrical piece of work W to be ground, with said guides 30 engaging the work at opposite sides thereof. In this way, the work is properly supported for rotatable movement, in contact with a grinding wheel 34 secured to an arbor 36 on the lathe spindle, for high speed rotation of the grinding wheel.

A compound slide 38 is provided with a depending turntable portion 40 rotatably mounted upon the cross slide. The turntable portion 40 is integral with a base 42 having a tongue 44 engaging in a complementary groove of a platform 46, thus mounting the platform 46 for sliding movement upon base 42. A crank 48 operates a suitable mechanism for slidably adjusting the platform 46 to selected positions.

Formed in the platform 46 is an upwardly opening slot of inverted T-shape, said slot being designated at 50 and receiving a mount 52 formed as particularly well shown in Fig. 4. The mount 52, thus, includes a support element having at its lower end a rib 54 of T-shape cross section slidably engaging in slot 50. The rib 54 extends downwardly from a flat, horizontal base portion 56 having transversely spaced slots 58 extending in parallelism with the rib 54.

Extending through the slots 58 are clamp bolts 60, said clamp bolts threading into tapped openings formed in the platform 46 at opposite sides of the T-slot 50 thereof. In this way, the entire mount 52 can be adjusted transversely of the compound slide to selected positions relative to the grinding wheel.

In the upper end portion of the vertically disposed, flat, relatively wide standard 62 of the mount there is formed a smooth-walled opening 64, and extending through said opening is a stub shaft or spindle 66, the spindle being rotatable to selected positions within the opening 64, and being fixed against movement in each of said positions by lock nuts 68 threadable upon the spindle against the opposite faces of the standard 62.

At its other end, the spindle 66 is integral or otherwise made rigid with the lower end of a flat, rectangular regulating wheel support plate 70 having at its upper end transversely aligned ears 72 having bearing openings in which is rotatably journaled the intermediate portion of a regulating wheel shaft 74. At one end of shaft 74 there is keyed to the shaft or otherwise secured thereto a regulating wheel 76, while at the other end of the shaft there is attached the crank 78.

By reason of the arrangement illustrated, the regulating wheel can be adjusted about the axis of spindle 66 to a position such as that shown, for example, in Fig. 3. In this position of the regulating wheel it is disposed in a plane oblique to the plane of the grinding wheel 34. The work W, in the meantime, extends with its long axis parallel to the axis of rotation of the grinding wheel.

As will be noted, the arrangement makes use of certain parts which, considered per se, are conventional. Thus, the work rest or centerless holder 24 does not, in and of itself, constitute part of the present invention, since rests of this type have been used on centerless grinding machines heretofore. Further, the cross slide and

the compound slide, and the construction of the lathe itself, are not new. Novelty is believed to reside, however, in the adaptation of the lathe to centerless grinding, by supporting of a work rest directly upon the cross slide, and by rotatably mounting a regulating wheel upon the compound slide of the lathe. Further, the particular mount shown in Fig. 4 is believed to be novel, per se, and in the combination illustrated and described herein.

In use of the device, the work W is supported upon the thin blade 32, between the work guides. It will be understood that the work rest is of a type which will permit the work guides 30 to be adjusted toward and away from the work W, in a direction transverse of the work. Suitable means is embodied in a work rest of this type to permit these adjustments to be effected.

With the work W and blade parallel to the grinding wheel spindle, the work is positioned between the grinding wheel and the regulating wheel 76, the regulating wheel 76 having been previously adjusted to a selected angular relationship relative to the grinding wheel. The regulating wheel is now turned slowly to rotate the work piece so that it will be ground truly round, the grinding wheel meanwhile rotating at a high speed. The angular disposition of the regulating wheel relative to the grinding wheel will advance the work, and as the operation continues, the work will be properly ground to a true cylindrical formation, being formed to a circular cross section of a selected diameter.

The accurate positioning of the work relative to the grinding wheel, and the accurate positioning of the regulating wheel relative to the work and the grinding wheel, is effected by the use of conventional lathe parts, said positioning being brought about by operation of the cross slide and compound slide cranks, and by angular adjustment of the mount 52 upon the compound slide platform.

The slow rotation of the regulating wheel is brought about, of course, by manual rotation of the crank 78. Alternatively, a motor, geared down to a selected extent, can be used to rotate the regulating wheel shaft, this being considered sufficiently obvious as not to require special illustration herein.

Still further, the transverse adjustment of the mount 52 relative to the compound slide permits the regulating wheel to be shifted laterally of the plane of the grinding wheel, to a selected location relative to said plane.

It will be understood, further, that the regulating wheel would be turned slowly in the same direction as the grinding wheel, as shown by the arrows in Fig. 1.

The truing and dressing of the regulating wheel can be effected by the rotation of it while its peripheral face is passed across the face of the grinding wheel.

While I have illustrated and described the preferred embodiment of my invention, it is to be understood that I do not limit myself to the precise construction herein disclosed and the right is reserved to all changes and modifications coming within the scope of the invention as defined in the appended claims.

Having thus described my invention, What I claim as new, and desire to secure by United States Letters Patent is:

1. A centerless grinding unit for attachment to a lathe

comprising in combination with the compound slide structure and the grooved trackway constituting the cross slide structure of a lathe, a wheel support adjustable mounted on the compound slide structure and a work rest mounted on the cross slide structure, the mounting of the wheel support consisting of a slot T-shaped in cross-section in the compound slide structure, an upstanding mounting plate with a horizontal base and a rib therebeneath slidably engaged in the slot, said plate having a central opening therein, a bolt and slot connection between the base and compound slide structure for adjusting the position of the mounting plate on the compound slide structure, a shaft-supporting device including perforated ears connected to said mounting plate, the connection between the device and plate including a threaded spindle connected at one end to the device with its other end extended through the opening in the mounting plate and a nut on the threaded end of the spindle, a shaft journaled in said perforated ears, a regulating wheel supported on one end of said shaft, and a crank secured to the other end of the shaft for rotating the same.

2. A centerless grinding unit for attachment to a lathe comprising in combination with the compound slide structure and the grooved trackway constituting the cross slide structure of a lathe, a wheel support adjustably mounted on the compound slide structure and a work supporting device mounted on the cross slide structure, the mounting of the wheel support consisting of a slot T-shaped in cross-section in the compound slide structure, an upstanding mounting plate with a horizontal base and a rib therebeneath slidably engaged in the slot, said plate having a central opening, a bolt and slot connection between the base and compound slide structure for adjusting the position of the mounting plate on the compound slide structure, a shaft-supporting device including perforated ears connected to said mounting plate, the connection between the device and plate including a threaded spindle connected at one end to the device with its other end extended through the opening in the mounting plate and a nut on the threaded extended end of the spindle, a shaft journaled in said perforated ears, a regulating wheel supported on one end of said shaft, and a crank secured to the other end of the shaft for rotating the same, said work supporting device including a platform slidably mounted in the groove in said trackway constituting the cross slide structure, an enlargement at one end of said platform extending laterally of both sides thereof, said enlargement having a grooved portion, and a work supporting member adjustably supported in said grooved portion.

#### References Cited in the file of this patent

##### UNITED STATES PATENTS

1,440,639	Smith	Jan. 2, 1923
1,483,748	Sanford	Feb. 12, 1924
1,575,557	Einstein	Mar. 2, 1926
1,722,386	Norton	July 30, 1929
1,985,433	Turner	Dec. 25, 1934
2,466,478	Riley	Apr. 5, 1949
2,568,825	Rosaz	Sept. 25, 1951